

Biology Research Seminar

Monroe Hall, Room 157
12:30 - 1:30 pm

April 1

*"How do you define
a dinoflagellate?"*

Dr. Timothy Mclean
University of Southern Mississippi



Karenia brevis is a planktonic dinoflagellate that is responsible for the occurrence of harmful algae blooms (or "red tides") along the coast of the southeastern United States, primarily in the Gulf of Mexico. During these blooms toxins produced by *K. brevis*, called brevetoxins, lead not only to massive fish mortalities, but also the mortality of marine mammals, sea birds and other marine life, the contamination of shellfish stocks, and adverse effects to human health. For *K. brevis*, little is known about its physiology--even less about what environmental factors are responsible for or contribute to its ability to form blooms or produce toxins. The physiology of an organism and how it responds to its environment are determined by the organism's genes and how the expression of those genes is controlled. One of my aims is to use a functional genomics approach to investigate and understand the correlation between gene expression of *K. brevis* and the physiological and ecological nature of the organism. To this end, I have created an expressed sequence tag (EST) library of *K. brevis*. Currently, I have over 18,000 high-quality ESTs isolated from cultures of *K. brevis*. From these sequences I have create *K. brevis* microarrays containing almost 6,000 unique elements. In collaboration with researchers at the University of Miami and Florida International University (as part of the Ocean and Human Health Center located at the University of Miami), different measures of physiology, such as growth rate and rate of carbon fixation, or toxin production are measured for cultures of *K. brevis* grown under different environmental conditions. Then, I harvest mRNA from these cultures and use it with my microarrays to determine what genes are differentially regulated in response to these different culture conditions, e.g. varying levels of light, nitrogen, phosphorus, or iron.